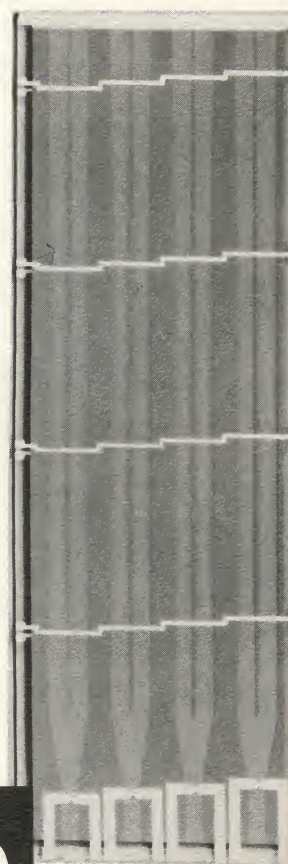
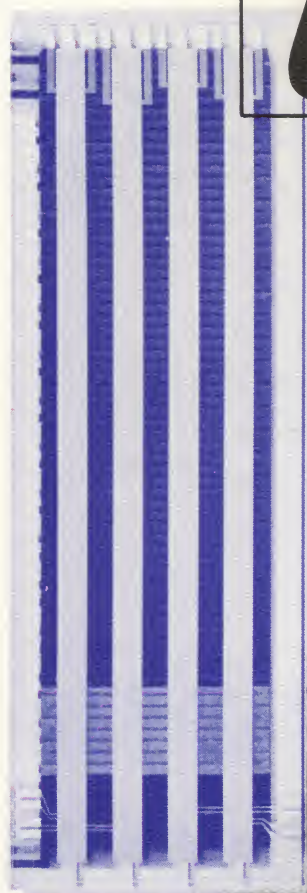


BROADBENT
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INCORPORATED

Strip-Register Products



3431 LOMITA BOULEVARD • TORRANCE • CALIFORNIA • (213) 325-7373

SRU2

The SRU2 is a high density self-contained STRIP-REGISTER* memory and electronics on a single 4.5" by 6" plug in module. The SRU2 is an asynchronous, serial, shift register and will operate at any speed from 0 to 1,000,000 bits per second. It is a non-volatile device and can be ordered in any length up to 340 bits per module. The standard voltages required to operate this unit are $\pm 10\text{Vdc}$ regulated and $\pm 18\text{Vdc}$ unregulated for biasing purposes. The SRU2 should be ordered in terms of the maximum operating frequency and number of bits desired.

Example: SRU2 - (No. Bits) - (Frequency in KC)

SRU2 - 340-1000

This would be: 340 bits

1 MC maximum operating frequency

All of the logic, propagation and write drivers, and read amplifiers are mounted on the plug in card in small potted modules. These modules are also available separately.

SRD2

The SRD2 is the same STRIP-REGISTER memory used in the SRU2 except the memory and the read amplifiers are mounted on a single 4.5" by 6" plug in module. No logic or driving electronics are provided with this unit.

SRE2

The SRE2 contains all of the logic and propagation and write drivers required to operate any standard BLI STRIP-REGISTER device. It is designed to be used in conjunction with the SRD2 and provides all of the pulses and gates necessary to operate the SRD2 module.

FG-20

The FG-20 Function Generator provides a master clock (variable duty cycle) multivibrator with a frequency of from 1CPS to 1MC. It also provides a number of "test" patterns that can be fed into the STRIP-REGISTER memory to check its operation. The frequency of the clock can be controlled externally on the panel of the card cage if desired.

Output Logic Levels:

TRUE	$8\text{V} + 2\text{Vdc}$
FALSE	$0\text{V} + 1\text{Vdc} - 1/2 \text{Vdc}$

The rise and fall time of the output pulses have the proper characteristics to be used with any of the STRIP-REGISTER memory units.

* Trademark of BLI. Patented thin-magnetic film memory.

CC-10

The CC-10 card-cage requires only 5-1/4" by 19" panel space, and provides 1-1/2" clearance behind the front panel for mounting of controls or indicators. It may be mounted so that cards plug in from the front or rear of the cage. This cage can hold up to 16 standard SRU2 STRIP-REGISTERS. It projects 8-1/2" behind the front panel and is supplied less connectors and panel.

PC-10

The PC-10 is a powered card cage. It is supplied with a PS-12 power supply, a-c switch, fuse and pilot light on the front panel. No connectors are provided. The power supply is capable of powering two STRIP-REGISTER units operating at 1MC as well as their associated logic circuitry. The CC-10 card cage is used in this unit. There is 10" left in this cage for circuit cards after the power supply is mounted in one end.

PC-11

The PC-11 is identical to the PC-10 except it has a PS-12 power supply mounted in both ends of the card cage and is capable of powering four STRIP-REGISTER units operating at 1MC and their associated logic circuitry.

XC-10

The XC-10 extender card provides complete access to any standard BLI card while it is electrically mounted in its circuit connection.

BC-10

The BC-10 is a blank card of the standard BLI size which plugs into a 35 pin BLI connector. The card is 4-1/2" wide by 6" long, including the pin connector.

EC-10

Mil approved card socket connector with solder tail and 1/2" card guides.

PS-20

The PS-20 plug in power supply mounts easily with four screws to any flat surface. It measures 12" long x 3" high x 4-7/8" wide. A PS-20 provides all of the power needed for two STRIP-REGISTER units operating at 1MC and their associated logic circuitry. Trimpots allow $\pm 10\%$ adjustment to the ± 10 Vdc voltages. Bias voltages of ± 18 Vdc are also provided. An 8" input-output cable with a 15 pin connector is provided with each supply.

Brief Specifications:

Regulated voltages at 2 amps	5 mv ripple
	1% regulation
Bias voltages	1.0V ripple

PS-21

The PS-21 is designed for rack mounting in systems using STRIP-REGISTER units. It provides up to 6.5 amps of each regulated voltage as well as the bias level voltages. The front panel contains a power switch and indicator. Each PS-21 supply has two d-c fuses. Dimensions 5-1/4" high x 12" deep.

Brief Specifications:

Maximum load 6.5 amps
Ripple and regulation same as PS-20

PS-22

The PS-22 supply is a heavy duty regulated power supply. It provides simultaneously up to 12 amps of both $\pm 10\text{Vdc}$ as well as 350 ma of the $\pm 18\text{Vdc}$ bias levels. It is self-contained with an internal blower, plug in regulator card, power cord, and multiple output terminals for each voltage on rear Jones strip. Local or remote sensing may be used for the $+10\text{Vdc}$. The front panel contains the power switch, indicator, and ac and dc indicating fuse holders.

Brief Specifications:

All regulated voltages	± 20 mv or less ripple
$\pm 10\text{Vdc}$ at 12 amps	$\pm 3\%$ for 10% to 100% load change
$\pm$ Bias levels (18Vdc)	1V ripple or less

SRC-10A

The SRC-10A is a PC-10 wired with an additional connector to accept one SRU2 STRIP-REGISTER unit. Input-output jacks for the STRIP-REGISTER memory using BNC connectors can be made available on the front panel at no additional cost if requested at the time of order.

SRC-10B

The SRC-10B is a PC-10 wired with a connector for a FG-20 Function Generator and an additional connector to accept one SRU2 STRIP-REGISTER unit. A "Write Test Function" switch and "Frequency Select" switch are mounted on the front panel along with a "Fine Frequency" control and sync output jack. Input-output jacks, for the STRIP-REGISTER memory, using BNC connectors can be made available on the front panel, at no additional cost, if requested at the time of order.

SRC-10C

The SRC-10C is identical to the SRC-10A except that connectors are provided for two SRU2 STRIP-REGISTER units. The two STRIP-REGISTER connectors can be connected in either series or parallel for information flow in the two registers. Unless otherwise specified at the time of order, the register connectors will be hooked up in parallel.

SRC-10D

The SRC-10D is identical to the SRC-10B except that connectors are provided for two SRU2 STRIP-REGISTER units. The two STRIP-REGISTER connectors can be connected in either series or parallel for information flow in the two registers. Unless otherwise specified at the time of order, the register connectors will be hooked up in parallel.

SRC-11A

The SRC-11A is a PC-11 wired with three additional connectors to accept SRU2 STRIP-REGISTER units. Input-output jacks, for the STRIP-REGISTER memory, using BNC connectors can be made available on the front panel, at no additional cost if requested at the time of order. The three STRIP-REGISTER connections can be connected in any series or parallel combination desired for information flow in the three registers. Unless otherwise specified, at the time of order, the register connectors will be hooked up in parallel.

SRC-11B

The SRC-11B is a PC-11 wired with three additional connectors to accept SRU2 STRIP-REGISTER units and a connector for an FG-20 Function Generator. A "Write Test Function" switch and "Frequency Select" switch are mounted on the front panel along with a "Fine Frequency" control and sync output jack. Input-output jacks, for the STRIP-REGISTER memory, using BNC connectors can be made available on the front panel, at no additional cost, if requested at the time of order. The three STRIP-REGISTER connections can be connected in any series or parallel combination desired for information flow in the three registers. Unless otherwise specified, at the time of order, the register connectors will be hooked up in parallel.

SRC-11C

The SRC-11C is a PC-11 wired with four additional connectors to accept SRU2 STRIP-REGISTER units. Input-output jacks, for the STRIP-REGISTER memory, using BNC connectors can be made available on the front panel, at no additional cost if requested at the time of order. The four STRIP-REGISTER connections can be connected in any series or parallel combination

desired for information flow in the four registers. Unless otherwise specified, at the time of order, the register connectors will be hooked up in parallel.

SRC-11D

The SRC-11D is a PC-11 wired with four additional connectors to accept SRU2 STRIP-REGISTER units and a connector for an FG-20 Function Generator. A "Write Test Function" switch and "Frequency Select" switch are mounted on the front panel along with a "Fine Frequency" control and sync output jack. Input-output jacks, for the STRIP-REGISTER memory, using BNC connectors can be made available on the front panel, at no additional cost, if requested at the time of order. The four STRIP-REGISTER connections can be connected in any series or parallel combination desired for information flow in the three registers. Unless otherwise specified, at the time of order, the register connectors will be hooked up in parallel.

SRC-12A

SRC-12A is a PC-10 wired with an additional connector to accept one SRE2 and one SRD2 STRIP-REGISTER unit. Input-output jack for the STRIP-REGISTER memory using BNC connectors can be made available on the front panel at no additional cost if requested at the time of order.

SRC-12B

The SRC-12B is a PC-10 wired with a connector for a FG-20 Function Generator and an additional connector to accept one SRE2 and one SRD2 STRIP-REGISTER unit. A "Write Test Function" switch and "Frequency Select" switch are mounted on the front panel along with a "Fine Frequency" control and sync output jack. Input-output jacks, for the STRIP-REGISTER memory, using BNC connectors can be made available on the front panel, at no additional cost, if requested at the time of order.

SRC-12C

The SRC-12C is identical to the SRC-12A except that connectors are provided for two SRE2 and two SRD2 STRIP-REGISTER units. The two STRIP-REGISTER connectors can be connected in either series or parallel for information flow in the two registers. Unless otherwise specified at the time of order, the register connectors will be hooked up in parallel.

SRC-12D

The SRC-12D is identical to the SRC-12B except that connectors are provided for two SRE2 and two SRD2 STRIP-REGISTER units. The two STRIP-REGISTER connectors can be connected in either series or parallel for information flow in the two registers. Unless otherwise specified at the time of order, the register connectors will be hooked up in parallel.

SRC-13A

The SRC-13A is a PC-11 wired with three additional connectors to accept SRE2 and SRD2 STRIP-REGISTER units. Input-output jacks, for the STRIP-REGISTER memory, using BNC connectors can be made available on the front panel, at no additional cost if requested at the time of order. The three STRIP-REGISTER connections can be connected in any series or parallel combination desired for information flow in the three registers. Unless otherwise specified, at the time of order, the register connectors will be hooked up in parallel.

SRC-13B

The SRC-13B is a PC-11 wired with three additional connectors to accept SRE2 and SRD2 STRIP-REGISTER units and a connector for an FG-20 Function Generator. A "Write Test Function" switch and "Frequency Select" switch are mounted on the front panel along with a "Fine Frequency" control and sync output jack. Input-output jacks, for the STRIP-REGISTER memory, using BNC connectors can be made available on the front panel, at no additional cost, if requested at the time of order. The three STRIP-REGISTER connections can be connected in any series or parallel combination desired for information flow in the three registers. Unless otherwise specified, at the time of order, the register connectors will be hooked up in parallel.

SRC-13C

The SRC-13C is a PC-11 wired with four additional connectors to accept SRE2 and SRD2 STRIP-REGISTER units. Input-output jacks, for the STRIP-REGISTER memory, using BNC connectors can be made available on the front panel, at no additional cost, if requested at the time of order. The four STRIP-REGISTER connections can be connected in any series or parallel combination desired for information flow in the four registers. Unless otherwise specified, at the time of order, the register connectors will be hooked up in parallel.

SRC-13D

The SRC-13D is a PC-11 wired with four additional connectors to accept SRE2 and SRD2 STRIP-REGISTER units and a connector for an FG-20 Function Generator. A "Write Test Function" switch and "Frequency Select" switch are mounted on the front panel along with a "Fine Frequency" control and sync output jack. Input-output jacks, for the STRIP-REGISTER memory, using BNC connectors can be made available on the front panel, at no additional cost, if requested at the time of order. The four STRIP-REGISTER connections can be connected in any series or parallel combination desired for information flow in the three registers. Unless otherwise specified, at the time of order, the register connectors will be hooked up in parallel.

POTTED ELECTRONIC MODULES

SL20-1

The SL20-1 is a part of the logic electronics required to operate a standard STRIP-REGISTER device. It contains a clock inverter and shaping circuit as well as the write pulse width one-shot multivibrator.

SL20-2

The SL20-2 is a part of the logic electronics required to operate a standard STRIP-REGISTER device. It contains a "Mod. Four" counter for the logic.

SL20-3

The SL20-3 is a part of the logic electronics required to operate a standard STRIP-REGISTER device. It contains the propagation pulse width one-shot and the read strobe delay one-shot multivibrator.

SL20-4

The SL20-4 is a part of the logic electronics required to operate a standard STRIP-REGISTER device. It contains eight three term "and" gates used in the logic.

PD-20

The PD-20 is a bipolar propagation drive module. It requires a positive gate to operate it and can provide both a positive and negative current pulse of a maximum of 1.2 amps. Two of these modules are required to operate a standard BLI STRIP-REGISTER device.

WD-20

The WD-20 is a write driver and provides four separate write drive pulses. It requires a positive gate input and can provide a drive current of up to 800 ma.

RA20-1

The RA20-1 is a pair of high gain differential input amplifiers for use on a single STRIP-REGISTER device. It has a voltage gain of approximately 10,000 as well as high common mode noise rejection.

RA20-2

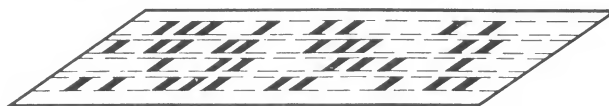
The RA20-2 is a module designed to be used in conjunction with the RA20-1. It consists of a mixer, threshold detector and an output flip-flop to provide an NRZ or RZ output.



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NEW HIGHER CAPACITY, LOWER COST THIN-FILM SHIFT REGISTER



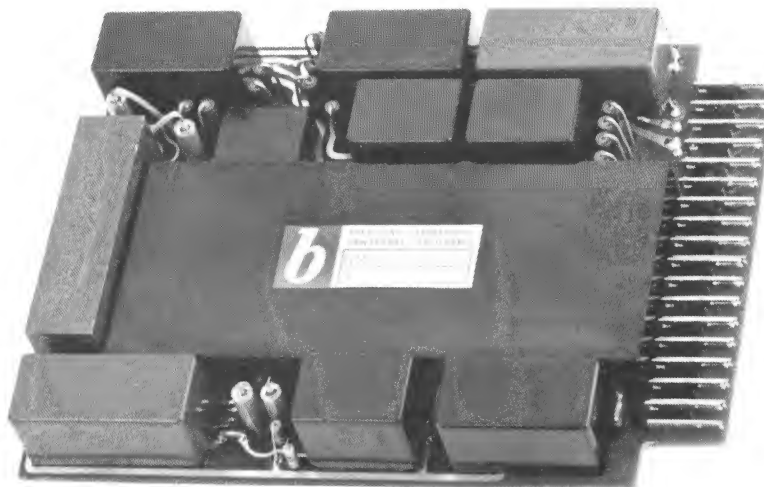
Technical Data
for MODEL SRU2

BROADBENT LABORATORIES INCORPORATED

340 Shift Register Bits
Per Module

Asynchronous
Operates any speed
From 0 to 1,000,000
Bits Per Second

Thin Magnetic Film
*Strip-Register** Memory



Non-Volatile

Self Contained
Memory and Electronics
on 4.5" x 6" Plugin Module

Custom Configurations
Available for Special
Applications

MODEL SRU2

Applications

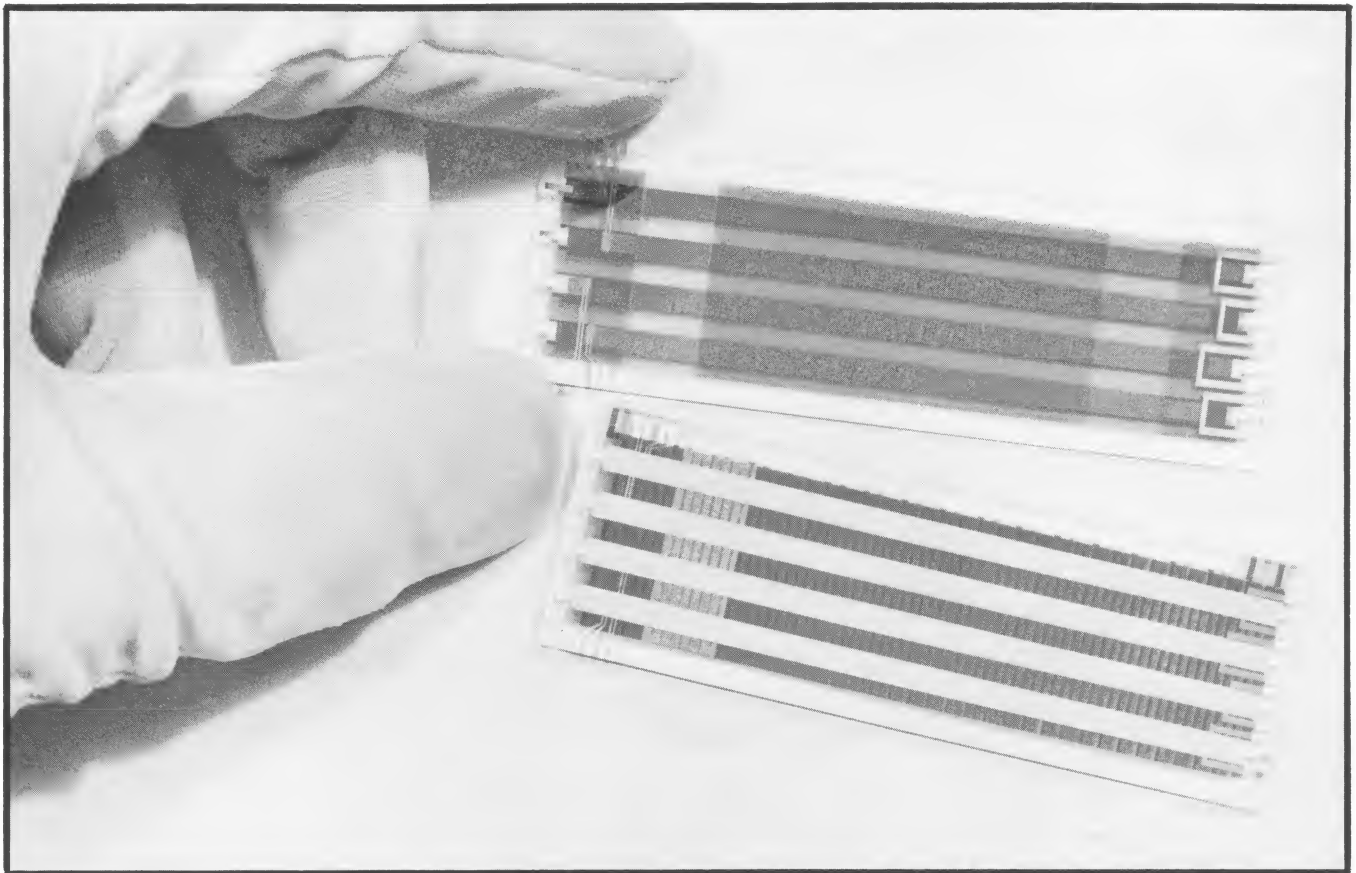
- BUFFERS INVOLVING CHANGES IN INFORMATION RATES
- RE-CIRCULATING INFORMATION LOOPS
- REPLACING FLIP-FLOP, CORE-DIODE, CORE-TRANSISTOR CHAINS
- START, STOP - STORE APPLICATIONS
- MEMORY FOR SERIAL ARITHMETIC PROCESSORS
- INPUT/OUTPUT BUFFERS FOR MASS MEMORY SYSTEMS
- CUSTOM BUFFER CONFIGURATIONS FOR: CARD PUNCHES
CARD READERS
LINE PRINTERS

GENERAL CHARACTERISTICS OF SRU2

Maximum Serial Readout Rate	1,000,000 bits/sec.
Maximum Shift Trigger (clock)	1,000,000 cycles/sec.
Input/Output Configuration	Serial
Input/Output Levels	0 and +8 volts
Storage Capacity Per Card	May be ordered in any length up to 340 bits
Operating Temperature Range	-25°C to +75°C

Power supplies and exercise circuitry are available for use with *Strip-Register* Units

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The heart of the SRU2 is a vacuum deposited thin magnetic film *Strip-Register* of the type invented and developed by the staff of Broadbent Laboratories. This register stores digital information in the form of magnetic domains within a continuous thin magnetic film strip in the manner information is stored within a magnetic drum or tape surface. In contrast to drum and tape surfaces these techniques allow domains or bits of information to be shifted or translated through the magnetic material without involving any motion of the storage surface. This most unusual operation may be pictured as that of a static magnetic drum storage surface in which the bits of information are caused to flow along or through the surface rather than being moved along by moving the drum surface itself. The elimination of moving parts and inertial restrictions provides striking advantages for the thin-film system.

The operation should not be confused with that of fixed velocity delay lines. The *Strip-Register* is a true asynchronous shift register and its information may be shifted at any periodic or random rate ranging from zero to the maximum operating frequency.

The theoretical and operational details of this system are given in the initial paper on this subject, "A Thin Magnetic Film Shift Register", by Kent D. Broadbent, IRE TRANSACTIONS ON ELECTRONIC COMPUTERS, Vol. EC-9 Number 3, September, 1960.

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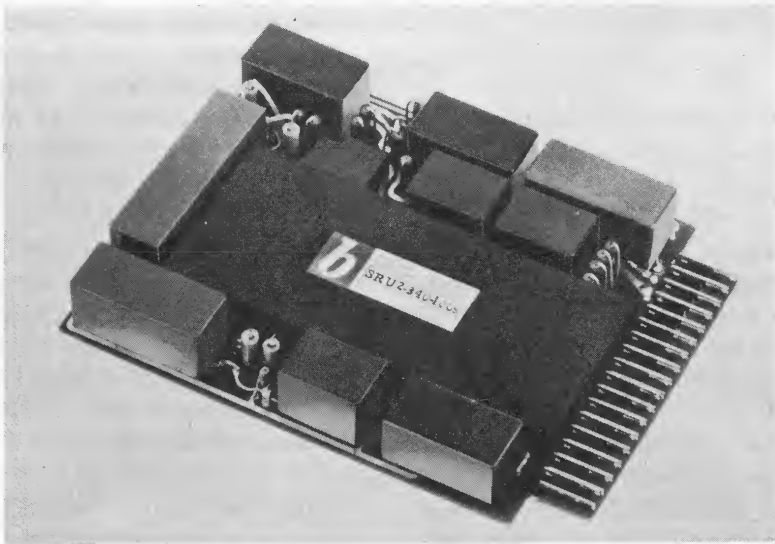
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ELECTRONIC DESIGN

New Products Directory

A complete index of all new products contained in this issue of ELECTRONIC DESIGN, listed by category with page and reader-service numbers. This index is designed to provide, along with indexes of past issues of ELECTRONIC DESIGN, a handy series of new product listings for use as reference by engineers.

Product Highlight



Thin film shift register

Use of a thin-film storage element allows a significant step in the miniaturization of magnetic shift registers. The Broadbent Labs Model SRU2 stores 340 bits in a 27 square inch modular package. Further specifications and applications for this versatile unit are offered on p. 80.

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ELECTRONIC DESIGN MAGAZINE

December 21, 1964



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Systems Consult CD
Box 1546
Poughkeepsie, New York

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- ☐ Send complete catalog of BLI Strip-Register Products.

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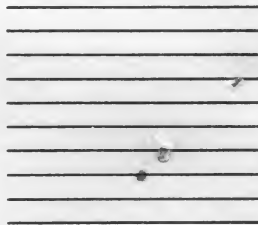
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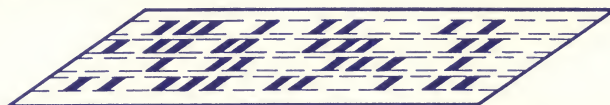
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MEMORY CARDS

SRU2	<u>STRIP-REGISTER</u> Memory Device and Electronics	
	Quantity	Price
	1-4	\$1,700.00
	5-9	\$1,360.00
	10-24	\$1,020.00
	25-99	\$ 800.00
	100 up	\$ 500.00
SRD2	<u>STRIP-REGISTER</u> Memory Device and Read Amplifier Only	
	Quantity	Price
	1-4	\$1,395.00
	5-9	\$1,055.00
	10-24	\$ 715.00
	25-99	\$ 564.00
	100 up	\$ 289.00

ELECTRONIC CARDS

SRE2	<u>STRIP-REGISTER</u> Electronics Only	
	Quantity	Price
	1-24	\$305.00
	25-99	\$236.00
	100 up	\$211.00
FG-20	Function Generator	\$130.00

CARD SOCKET

EC-10	Socket Connector for BLI Cards	\$ 3.00
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SPECIAL SERVICE CARDS

BC-10	Blank Card 4.5" x 6"	\$ 6.00
XC-10	Extender Card	\$16.00

POTTED ELECTRONIC MODULES

		1-24	25-99	100 up
SL20-1	Shift Logic Module	\$31.00	\$25.00	\$21.00
SL20-2	Shift Logic Module	46.00	36.00	32.00
SL20-3	Shift Logic Module	47.00	38.00	32.00
SL20-4	Shift Logic Module	27.00	22.00	20.00
PD20	STRIP-REGISTER Propa- gation Driver	54.00	46.00	33.00
WD20	STRIP-REGISTER Write Driver	35.00	29.00	24.00
RA20-1	Differential Read Amplifier	78.00	60.00	53.00
RA20-2	Read Amplifier Mixer, Detector and Output Flip-Flop	61.00	51.00	39.00

CARD CAGES

CC-10	Card Cage	\$29.00
PC-10	Powered Card Cage	267.00
PC-11	Powered Card Cage	543.00
SRC-10A	PC-10 Wired for 1 SRU2	279.00
SRC-10B	PC-10 Wired for 1 SRU2 and 1 FG-20	317.00
SRC-10C	PC-10 Wired for 2 SRU2	296.00
SRC-10D	PC-10 Wired for 2 SRU2 and 1 FG-20	335.00
SRC-11A	PC-11 Wired for 3 SRU2	455.00
SRC-11B	PC-11 Wired for 3 SRU2 and 1 FG-20	676.00
SRC-11C	PC-11 Wired for 4 SRU2	472.00
SRC-11D	PC-11 Wired for 4 SRU2 and 1 FG-20	478.00
SRC-12A	PC-10 Wired for 1 SRE2 and 1 SRD2	296.00
SRC-12B	PC-10 Wired for 1 SRE2 and 1 SRD2 and 1 FG-20	335.00
SRC-12C	PC-10 Wired for 2 SRE2 and 2 SRD2	314.00
SRC-12D	PC-10 Wired for 2 SRE2 and 2 SRD2 and 1 FG-20	364.00
SRC-13A	PC-11 Wired for 3 SRE2 and 3 SRD2	484.00
SRC-13B	PC-11 Wired for 3 SRE2 and 3 SRD2 and 1 FG-20	752.00
SRC-13C	PC-11 Wired for 4 SRE2 and 4 SRD2	525.00
SRC-13D	PC-11 Wired for 4 SRE2 and 4 SRD2 and 1 FG-20	531.00

POWER SUPPLIES

PS-20	Power supply, 12" x 3" x 4-7/8", provide 2 amp ± 10 Vdc regulated and bias voltages	\$350.00
PS-21	Power supply, 19" rack mount, 6.5 amp ± 10 Vdc regulated and bias voltages	650.00
PS-22	Power supply, 19" rack mount, 12 amp ± 10 Vdc regulated and bias	800.00

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